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AGRICULTURAL NEWS LETTER

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This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations by the du Pont Company. It also contains published reports of investigators at agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.

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Agricultural News Letter (Du Pont)
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DU PONT "LEXONE" -- NEW HEXACHLOROCYCLOHEXANE INSECTICIDE

Initial production of a new insecticide containing hexachlorocyclohexane, which has been tested with success against a number of important crop pests both in the United States and abroad, is announced by the Du Pont Company.

This new agricultural chemical weapon is being made available as Du Pont "Lexone" insecticide for large-scale experimental work and for use on selected crops during the coming season to establish its exact place in the field of agricultural chemicals.

The new insecticide contains 50 per cent hexachlorocyclohexane in a wettable powder formulation suitable for application in a water spray and for further dilution for dust application.

Shows Promise Against Many Insects

"In research thus far, this new insecticide has shown promise for control of cattle lice, many insects of cotton, including aphids, and for certain insects that have heretofore been difficult or impossible to control," the statement, issued by the company's Grasselli Chemicals Department says. It adds:

"Considerable promise has been shown by this chemical in control of locusts or grasshoppers, and large-scale usage for that purpose has been reported from Africa and other Mediterranean countries. As a contact insecticide, it may have limited residual properties. It also has insecticidal action as a fumigant for certain uses."

Field Trials and Comparative Tests Under Local Conditions

Although hexachlorocyclohexane, which was developed during the war as an insecticidal ingredient by Imperial Chemical Industries, Ltd., of England, shows promise against a number of destructive insects, further field trials and comparative tests under local conditions will be required to obtain essential information regarding its value as an agricultural chemical, according to entomologists in the Du Pont Pest Control Research Laboratory here.

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TWO PLANT DISEASES, STRIKING UNEXPECTEDLY, TAKE HEAVY TOLL

Two plant diseases that developed unexpectedly over large areas last year took a heavy toll of two important American farm crops -- oats and tomatoes.

These diseases (helminthosporium blight of oats and late blight of tomatoes) spread rapidly throughout much of the country before plant pathologists could organize their defenses to cope with them on a nationwide scale.

Fortunately, however, enough evidence was obtained in 1946 to enable the scientists to establish the fact that there were available two standard fungicides that can be counted on this coming season to help reduce to a minimum the losses from the two diseases.

The following two items include information concerning the use of New Improved "Ceresan" seed disinfectant against the helminthosporium disease of oats and the use of Copper-A Compound against the late blight of tomatoes.

PLANT PATHOLOGISTS RECOMMEND NEW IMPROVED "CERESAN" TO COMBAT OATS DISEASE THAT APPEARED THROUGHOUT U.S. LAST SEASON

A new and threatening plant blight that appeared on American farms for the first time last season now faces an old, established chemical fungicide in the never-ending fight of science against the ravages of plant disease.

This chemical weapon -- New Improved "Ceresan" seed disinfectant -- is being recommended wholeheartedly by plant pathologists throughout the country in the all-out campaign now being organized to reduce the severe damage from the new oats disease, called helminthosporium blight. This disease turned a potential record-breaking 1946 crop into just an average one. The ethyl mercury phosphate dust recommended for use in fighting this new disease has long been the standard treatment for control of a variety of plant diseases on all grain crops.

The unexpected outbreak of the new seed-borne and soil-borne oats disease, reported from Texas to New York and from Florida to Montana, caused particularly heavy losses to the Victoria-strain varieties.

In Iowa State College experiments, untreated Victoria seed yielded only 30 bushels per acre, while treated yielded 49. In New York Experiment

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Station tests with New Improved "Ceresan", 88 per cent of the plants from the treated seeds were healthy at 30 days old, 2 per cent were diseased, none killed, and 4 per cent of the seed were rotted. (94% of the seed were viable.) From untreated seed of the same lot only 65 per cent were healthy, 10 per cent diseased, 5 per cent dead, and 14 per cent of the seed were rotted.

Stress Importance of Resistant Varieties

While most plant pathologists realize the importance of using resistant varieties where possible, they are generally reluctant to change their variety recommendations and are therefore stressing seed treatment. Ralph M. Caldwell of Purdue says Indiana farmers will continue to plant the varieties now being grown, but adds: "We shall recommend that all Victoria Richland hybrids be treated with New Improved 'Ceresan' to control the seed-borne phase of the disease." H. K. Hayes, Minnesota Experiment Station, recommends resistant varieties, but says he does not see how all farmers can plant resistant varieties. He says also that Minnesota plant pathologists recommend seed treatment. C. N. Nagel of the South Dakota Station says: "Since New Improved 'Ceresan' provides marked control of this disease, we plan to launch a seed-treatment program." E. D. Hansing, Kansas State College, likewise suggests that susceptible varieties be treated. Other plant pathologists in affected states have indicated agreement with their fellow-scientists in urging treatment of seed to be planted in 1947, at the rate of one-half ounce per bushel of seed.

Seed Disinfectant Controls Many Diseases In Grain Crops

Du Pont plant pathologists point out that New Improved "Ceresan" can be applied to wheat, barley, rye, millet, flax, and sorghum, as well as to oat seeds, to help control the following diseases: Wheat -- seed-borne stinking smut (not loose smut.) Reduces seedling blights and root-rot. Barley -- seed-borne stripe disease, covered and black (not brown) loose smuts. Reduces seedling blights. Rye -- stinking and stem smuts. Reduces scab seedling blight. Millets -- smut of foxtail millet and proso (hog or broomcorn millets.) Flax -- reduces damping-off and seed decay. Sorghums -- both loose and covered kernel smuts.

NOTE: For additional information on New Improved "Ceresan" seed disinfectant, write the Semesan Division, Wilmington 98, Del.

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COPPER-A COMPOUND SUCCESSFUL AGAINST LATE BLIGHT OF TOMATO

Copper-A Compound, a fungicide based on tetra copper calcium oxychloride, is Du Pont's surest chemical weapon for the coming season's battle against late blight of tomatoes -- the disease that caused more than 50 million dollars loss to American growers in 1946.

First reported from Florida, the disease spread rapidly east of the Mississippi river and later to many areas throughout the remainder of the country.

Plant pathologists throughout the country mobilized rapidly, and the season's work on spraying with Copper-A Compound was encouraging. Many growers already were using Copper-A on tomato plants for control of anthracnose and for early blight and Septoria blight leaf-spot diseases, both in the seedbed and in the field, as well as for a variety of plant diseases on many other crops.

While the exact identity of the strain of the fungus causing the late blight of tomatoes has not been determined, some plant pathologists say it may be the late-blight-of-potato strain. Others think it may be a new strain of the potato late blight fungus that has adapted itself to tomatoes.

The causal fungus grows best at low temperatures and high humidities. It produces numerous tiny spores that are carried easily from field to field by the wind, by animals such as dogs and rabbits, and possibly even by insects. Once the disease starts on the foliage, it quickly spreads to the fruit, both ripe and green, where it becomes serious in a short time.

Symptoms of the Disease

On tomato leaves, the blight first appears as irregular blackish-green water-soaked spots. These spots enlarge rapidly and in moist weather a downy growth of fungus may appear around the infected area. On the tomato fruit itself, the blight attacks fruit in all phases of growth. The first symptoms are gray-brown water-soaked areas which may enlarge and cover half or more of the tomato. Then, as the fruit becomes older, the spots take on a green, blotched-with-brown appearance. The surface of the tomato itself is firm, but has a wrinkled or corrugated appearance. As the fruit ripens, the area becomes dark green and separated from the healthy red tissues by a green border. It takes about five days for infection of the tomato fruit to take on the above symptoms.

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CHEMICALS IMPORTANT IN GROWING HEALTHY PLANTS IN TOBACCO SEEDBEDS

"The preparation and management of the seedbeds may determine in a large measure the final outcome of the tobacco crop. It should be regarded as requiring fully one-fourth of the skill and labor of producing the crop instead of as a minor job to be performed in a hurry and with the least expenditure of effort."--Wisconsin Agri. Exp. Sta. Bulletin 467.

Use of formaldehyde drench to disinfect the soil, application of complete fertilizer plus supplemental nitrogen materials in solution to hasten growth where needed, and spraying with the new copper compounds to control certain diseases and insects are among the important practices recommended by Wisconsin tobacco specialists for the growing of strong, healthy plants in the seedbed.

Most Wisconsin tobacco growers, if they follow the recommendations of James Johnson and William B. Ogden in Wisconsin Agricultural Experiment Station Bulletin 467, "Tobacco Seed Beds," select the location of their seedbeds, which total about 100 acres in that State, and make at least some preparation, such as manuring, plowing, and soil steaming, in the fall.

Bulletin Urges Adoption of More Standard Methods

The bulletin points out some faulty practices, and discusses the advantages of new methods. It advocates early plant production; selection of the seedbed with a southern or eastern exposure, use of suitable old locations, reduction of weeds by chemical treatment, spring seedbed preparation, better spring steaming, use of reliable seed, good seedbed covers, proper watering, control of insects, and removal of covers to harden plants before transplanting.

"Several different diseases may occur in the seedbeds, and it is important to apply preventive measures in order to insure sufficient healthy plants for transplanting and to reduce the danger of introducing certain of these diseases into the field," the bulletin says.

Continued on next page

Formaldehyde As Soil Disinfectant

In presenting recommendations for the use of formaldehyde, the bulletin says that if soil steaming is not obtainable, fall treatment with formaldehyde is recommended. "Formaldehyde (formalin) is one of the oldest and best of the chemical treatments for disease and insect control, although it is not highly effective as a weed killer. It does, however, stimulate plant growth considerably when used as a fall treatment," the bulletin says.

Covering tbe soil with canvas or burlap for a day or two after treatment is suggested, "to help retain the fumes on the soil surface. The fumes are disagreeable, but not dangerous to the person in ordinary handling of the diluted solution for the specific purpose."

Chemicals for Weed Control

The bulletin says use of cyanamid in the fall to control weeds is often valuable, but "if used improperly may be harmful to the seedbed." It warns that formaldehyde and cyanamid treatments should not be combined, "since this increases the harmful effect of both chemicals." It adds that a combination of cyanamid and urea has been recommended for weed control in southern states, but the Wisconsin authorities are withholding recommendations on this until tests can be conducted under Wisconsin conditions.

New Copper Compounds to Control Diseases

Damping off or "bed rot", wildfire, and blackfire in the seedbed can be greatly reduced or controlled by use of the newer copper compounds, such as Du Pont's Copper-A Compound, applied as a sprinkle or spray, the bulletin says.

"These materials are Bordeaux mixture substitutes, and give better results than ordinary Bordeaux mixture," it adds. "Where wildfire is to be controlled, it is also advisable to add a 'spreader' or 'sticker' to the mixture. The new copper compounds are usually available in seedhouses, hardware stores, or drug stores. The cost of the material is a minor item in tobacco growing."

The bulletin advocates making the first application one to five days after sowing, with additional treatments once a week until transplanting time.

"After signs of disease have occurred on the plants, it is usually too late to secure good control and, as far as wildfire is concerned, it may be a better procedure to destroy the seedbeds and secure healthy plants elsewhere," it says. "The lower leaves and stems of properly treated tobacco seedlings are unusually clean and free from blemish as compared to the conditions often found in untreated beds. The treatment, if 100 per cent effective in the control of wildfire and blackfire in the seedbed, will normally also prevent the establishment of these diseases in the field."

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Fertilizer Recommendations

"Many growers apply too much commercial fertilizer on the seedbeds or do not mix it sufficiently with the soil," the bulletin warns. "The seed or young plants are hence frequently killed or checked in growth, resulting in a very uneven stand of plants. The fertilizer recommended for seedbeds is the same as that recommended for the field, namely, a 3-9-18S (3% nitrogen, 9% phosphoric acid, and 18% potash as sulfate), although other grades may be used." Rate of application is five pounds to 100 square feet. This amount should be carefully applied, since it may be harmful if in too close contact with seed or roots, as a consequence of poor mixing with the soil.

Nitrogen treatments for seedbeds, if needed, should be made preferably during early stages of growth of the plants, the bulletin says.

"When plants in the seedbed show a yellowish rather than a dark green color, are uneven in growth or fail to grow as rapidly as desired, the soil nitrogen may be low," it explains. "Under these circumstances the application of a solution of nitrogen may bring distinct improvement in three days to a week."

The discussion points out that plants forced with nitrogen just prior to transplanting may be too succulent for good survival in the field. "If treatment is to be applied, it should consequently not be delayed any longer than is necessary," it adds.

Insecticides

Some types of insects and other pests may often cause trouble in seedbeds, but they are not commonly serious enough to warrant measures being used before they appear to do damage, the bulletin says. These pests include especially springtails, flea-beetles, and cutworms. Other pests, such as slugs, earthworms, and ants may occasionally be present in sufficient numbers to be harmful.

The bulletin recommends insecticides for control of each of these pests, including nicotine sulfate (Blackleaf 40) for springtails; the new copper compounds, such as Copper-A recommended for disease control, for repelling flea-beetles, with addition of lead arsenate for heavy infestations; poison baits such as Paris green for cutworms; carbon disulfide for ants; and bichloride of mercury solution for earthworms. Special handling is recommended for slugs.

EDITOR'S NOTE ON "FERMATE" FUNGICIDE: Still another chemical compound has an important place in the growing of healthy plants in tobacco seedbeds in areas where blue mold is a factor. It is "Fermate" fungicide, containing ferric dimethyl dithiocarbamate, which has become the standard control for this disease wherever it appears. Elimination of blue mold means the grower can reduce the size of his seedbed because he need no longer worry about extra yardage to beat the disease. It also means he can establish a permanent plant bed.

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"FERMATE" FUNGICIDE COMPATIBLE WITH MANY SPRAYS, DUSTS, AND OILS

"Fermate" is the only available fungicide that can be used in combination with oil-lead arsenate or oil-nicotine sprays, says a revised leaflet of instructions on the use of this new organic fungicide based on ferric dimethyl dithiocarbamate.

The leaflet points out that "Fermate" is "an outstanding protective fungicide because of several distinctive properties." It says:

"'Fermate' is generally compatible in sprays or dusts with DDT insecticides; lead and calcium arsenates; nicotine sulfate or nicotine-bentonite; summer oil sprays, ground derris, cube, or timbo roots or extractives; dry wettable and flotation sulfurs; and most wetting and spreading agents."

Effective Against Many Fungi That Attack Various Plants

The leaflet says "Fermate" fungicide, applied before disease infection occurs, is highly effective against may fungi that attack a wide variety of crops, such as apples, pears, sweet and sour cherries, snap or string beans, celery, cranberries, tomatoes, lettuce, tobacco, and greenhouse and ornamental plants.

"'Fermate' is safe to use, and does not cause severe chemical russeting on certain varieties of pears and apples, as frequently results from the use of many copper fungicides," it adds.

Adheres Well to Foliage and Fruits

The fact that "Fermate" is a fluffy, black powder of very small particle size, relatively hard to wet, is one reason why it adheres well to foliage and fruits, the leaflet explains, in giving preferred methods of preparing the spray. It recommends use of a good spreader with "Fermate" sprays "only when necessary to get complete and uniform coverage;" and then only enough spreader should be added "to get good spreading without causing run-off."

One feature of the new leaflet is the revised discussion on the use of "Fermate" to control such apple diseases as scab, cedar-apple rusts, sooty blotch, fly-speck, bitter rot, black rot, apple blotch, and Brooks spot. And information on the use of "Fermate" on greenhouse and ornamental plants is included.

NOTE: Copy of "Fermate" leaflet mentioned above will be sent upon request. Address Agricultural Section, Grasselli Chemicals Dept., Du Pont Company, Wilmington 98, Del. A special leaflet on "Fermate" for control of blue mold in the tobacco seed bed is also available.

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DISCOVERY OF VITAMIN D_3 PROFOUNDLY AFFECTED POULTRY INDUSTRY

"One of the most spectacular and profound events in the history of poultry keeping was the discovery of vitamin D_3 twenty years ago, and its practical application to poultry and egg production," according to D. C. Kennard and V. D. Chamberlin, poultry research workers at the Ohio Agricultural Experiment Station, Wooster.

They say this discovery revolutionized the feeding and management of poultry, and made possible all-year poultry and egg production. This included, they say, hatching eggs, incubation, brooding, and the all-year production of pullets and broilers which has largely been responsible for the commercial poultry industry of today.

Rare Phenomenon In Research

"That the billion-dollar poultry industry could be so profoundly affected and so dependent upon the discovery and use of a single nutritional factor is a rare phenomenon in research," they assert. "The history of this factor reads more like fiction than fact.

"Fortunately, there has been no difficulty in securing ample vitamin D_3 at reasonable prices, even during wartime. The ever-present problem of the poultryman and the feed trade is to make sure that a given flock actually receives ample vitamin D_3 to meet its particular requirements," as outlined in the following pages.

OHIO TESTS EVALUATE VITAMIN D_3 AND CALCIUM IN RATION OF LAYERS

Results of recent experiments "make it clear to poultrymen that they can ill afford to take any chances with a deficiency of calcium or vitamin D_3 in the ration of their laying flock."

So say D. C. Kennard and V. D. Chamberlin, poultrymen at the Ohio Agricultural Experiment Station, Wooster.

"Moreover, the results emphasize the responsibility of the feed trade to render every possible assistance to poultrymen in meeting these problems," they add.

To learn more of the actual effects of deficiencies of vitamin D_3 and calcium, experiments were conducted from October 1 to August 16 by the Ohio

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Station with four groups of 50 Rhode Island pullet layers, each confined to indoor floor pens with an eastern exposure. The windows of the pens were kept open whenever the weather permitted. The different groups of layers received the same whole corn and oats mash mixture with and without the vitamin D_3 and calcium supplements. The layers were fed twice daily the amount of feed they would nearly consume between feeding periods. Except for one group, the oyster shell and granite grit were kept before the birds at all times. Shavings were used for floor litter.

Results of Experiments

The Ohio workers report that egg production of the hens that received the basal ration, supplemented with oyster shell and vitamin D_3 (the control group), was consistent throughout the 46 weeks of the test. In contrast, the egg production of the hens that received the same ration without oyster shell was consistently low -- or about half of the control group. The egg production of a third group of hens that received the basal ration supplemented with oyster shell but without vitamin D_3 began to be seriously affected the latter part of December. After this time, egg production for this third group ranged from 20 to 26 per cent until the first of April. After the first of April, the birds received the beneficial effects of the sun's rays, and their egg production averaged 40 per cent, until August 16.

Egg production of a fourth group that received the basal ration, without the vitamin D_3, broke severely the latter part of December. Upon again receiving vitamin D_3 beginning February 16, this group promptly responded with increased production from a low of 23 per cent to a high of 54 per cent within two weeks. In addition, during the same two weeks the eggs from this group changed from weak-shelled eggs with a breakage test of 71 per cent to strong-shelled eggs with a breakage test of only 15 per cent, and the weight of the eggs increased more than 5 ounces per dozen.

Response of Layers Termed "Phenomenal"

"Phenomenal, indeed, were the prompt responses from this group of layers when their starvation for vitamin D_3 came to an end," Kennard and Chamberlin exclaim.

This experiment lent additional evidence to the well-established fact that deficiency in any essential nutrient in the diet is sure to be attended by reduced efficiency in the utilization of other nutrients and by reduced returns per unit of feed consumed. In an effort to obtain essential calcium, those birds deprived of oyster shell and laying only half as many eggs as those getting oyster shell in their feed still ate almost the same amount of feed. This means twice the feed per dozen eggs. It is interesting to note, too, that this group, in an apparent effort to make up for the missing calcium consumed 47 times the granite grit eaten by the control group.

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The groups receiving no vitamin D_3 also consumed appreciably greater feed per dozen eggs laid than the birds whose diet contained the calcium and vitamin D_3 supplements.

Ample Vitamin D_3 for Special Purposes

Discussing the problem of ample vitamin D_3 for special purposes, the authors* explain that, for instance, "the requirements for growing chicks are about half those of layers; whereas a larger amount is required for the production of hatchable eggs."

"Moreover," they add, "there are the varying seasonal requirements --the greatest amount of vitamin D_3 supplement is, of course, required during the winter months."

The Ohio scientists point out also that winter deficiencies may arise from an inadequate vitamin D_3 potency in the mash, adding: "Even though the mash meets the vitamin D_3 requirement, there may be an inadequate intake of vitamin D_3 on the basis of total feed intake because the birds, especially the layers, may consume too much whole grain and too little mash. Then the poultrymen must always be on the lookout for evidence of vitamin D_3 deficiencies, especially during the winter months."

They say a suspected vitamin D_3 deficiency can generally be proved or disproved within three weeks by adding twice the usual amount of vitamin D_3 supplement to the mash.

The particular experiments reported by Kennard and Chamberlin were conducted with feeding oil fortified with vitamin D_3, supplied by Du Pont's "Delsterol" "D"-activated animal sterol, widely used by feed manufacturers and mixers all over the country to supply vitamin D_3 in poultry feeds.

Importance of Calcium in Ration

"Another primary consideration in connection with the feeding of layers is to provide at all times a suitable calcium supplement from which the egg shells can be made," they continue. "The best practice is to keep either oyster shell or some other equally suitable shell material or P.F.G. (poultry feeding grade, 90 per cent or more calcium carbonate) limestone grit before the layers at all times.

"The provision of plenty of calcium is the simplest, easiest, and least expensive of the essentials for egg production. Perhaps that is why it is so often taken for granted, instead of being given the attention which its importance warrants."

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* Kennard, D. C., and Chamberlin, V. D. The results when vitamin D and calcium fail the layers. Ohio Agr. Exp. Station Bimo. Bull. No. 232, Vol. 30.

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NYLON MAKES SUPERIOR LARIATS AND SADDLE GIRTHS

Many American cattlemen and other stockmen are finding nylon useful these days. Cowhands, particularly on the ranges of the west and southwest, are beginning to rope with nylon, now being fabricated into superior lariats. Experienced ropers are making enthusiastic reports.

And, an increasing number of the horses on which the cowpunchers ride will also become the beneficiaries of nylon's strength and abrasive resistance when they find themselves girded with nylon girths. They already have proven themselves superior for saddles on racehorses, with wide acceptance from jockeys and trainers.

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"X" DISEASE PREVENTED BY KILLING HOST PLANT WITH "AMMATE"

The "X" disease of peaches can be controlled easily by killing with Du Pont "Ammate" Weed Killer all wild chokecherry plants within 500 feet of the orchard. The common chokecherry has been identified as the responsible host plant on which the insects that carry the infestation overwinter.

"Up to 95 per cent kill can be expected from the first application," says the New York State Experiment Station.

A brief item in the August "Country Gentleman," based on the New York work, originally reported in Geneva (N. Y.) Experiment Station Bulletin No. 714, says the "X" disease, or yellow-red virus disease, in the past eight years has ruined many peach orchards and thousands of individual trees.

"Based on several years' experience with a method of successful control, the New York Station recommends that all chokecherry plants within 500 feet of peach trees be eradicated," the article says.

"A herbicidal spray has proved best and cheapest, since the persistent root systems of these plants make removal by cutting or burning impractical. Three-fourths of a pound of ammonium sulfamate* to a gallon of water should be applied to the foliage in midsummer."

*Ammonium sulfamate is the active ingredient in Du Pont's "Ammate" Weed Killer.

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FARMERS ENTHUSIASTIC ABOUT RODENTICIDES CONTAINING ANTU

American farmers, who annually lose around $63,000,000* to rats, are finding that rodenticides containing alpha-naphthyl thiourea, called Antu for convenience, are a big help in their campaigns against these expensive pests.

Rats eat and damage a lot of food, and spread diseases, among them scours of calves, mastitis, ringworm, tuberculosis, contagious abortion (Bang's disease), coccidiosis, infectious bronchitis of chickens, and trichinosis of swine.

Antu, now available to the public in commercial rat-killing preparations, rates high as a rodenticide. Such rodenticides are formulated specifically for control of the common brown or Norway rat (Rattus norvegicus), against which it is highly destructive. Antu is effective as a tracking poison, can be dusted on water, and can be dusted on or mixed with baits in the usual way. Norway rats consuming lethal doses usually succumb in 10 to 20 hours. Antu has a toxic effect upon other omnivorous and carnivorous rodents, but in a higher dosage range.

Typical Reports from Half A Dozen States

Reports are coming in from all over the country that farmers are enthusiastic about Antu preparations. Here are a few:

Ohio -- A farmer was troubled with rats from a neighbor's farm. He mixed an Antu rat killer with canned dog food, put it on paper plates, and placed it where evidence of rats had been seen. Next day he picked up 200 dead rats. It cost about a third of a cent per rat killed.

Iowa -- A farmer picked up 235 dead rats the day after baiting once. His cost was about a half cent for each one killed.

Indiana -- A farmer, who had let his rat population pile up because he had no faith in rat killers, picked up 90 dead rats in the first two days after baiting.

South Carolina -- A county agent persuaded a farmer to try a rat killer containing Antu. He dusted it on pork sausage lumps as big as the end of his thumb as a trial. Fifty rats were killed. Subsequently, the farmer did a real clean-up job with Antu.

*Estimate of U.S. Fish and Wild Life Service

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Kentucky -- A farmer who was sure he did not have any rats was persuaded by a druggist to try an Antu preparation. He picked up 34 dead ones, even without a thorough search in the grass and weeds.

Illinois -- Two farmers said they knew they had a few rats; but when they started picking up dead ones after putting out baits containing Antu, they decided that "for every live rat you see there must be 10 more you don't."

NOTE: Antu is toxic to dogs, cats, livestock, and poultry. For that reason, before using preparations containing Antu, full warning must be given to the inhabitants of premises and owners of pets, poultry, and livestock before the poison is used on the premises. Antu may be toxic to humans, but can be handled without hazard to the operator if precautions are taken to avoid inhaling the powder or contaminating foodstuff.

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COMMITTEE SAYS UREA IN DAIRY FEED TO HELP ELIMINATE PROTEIN SHORTAGE

Use of urea in cattle feed, the enlarged acreage of soybeans, and the improved practices in harvesting and preserving roughages will all help furnish much more available protein in the postwar period than the dairymen have had before, according to the American Dairy Science Association Committee on Postwar Dairy Production.

The report of the Committee, headed by O. E. Reed, chief of the U. S. Bureau of Dairy Industry, says "this automatically will mean increased milk yields, which in turn will mean lower costs per pound of milk." It adds: "One of the recent developments in the milk-production field is the discovery that rumen microorganisms can make protein from urea nitrogen, and that urea can be fed to dairy cows as a partial replacement for high-protein feeds."

Urea is supplied to feed manufacturers in Du Pont's "Two-Sixty-Two" feed compound.

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DDT GIVES EFFECTIVE CONTROL OF CORN BORER IN IOWA TESTS

DDT may be the answer to the farmer's long-time search for a practical and effective means of curbing corn-borer damage. That is the opinion of Dr. Harold Gunderson, Iowa State Entomologist, following tests on Muscatine Island and in Scott County, Iowa.

Dr. Gunderson reports that the DDT treatment on heavily infested sweet-corn fields reduced the borer population to as low as 6 per cent. Untreated strips in the same fields showed as much as 80 per cent infestation. Yields from infested fields were reduced two-thirds or more.

The initial treatment on the Muscatine Island farm of Harold Butcher was made the middle of June with 40 pounds of 3 per cent DDT dust applied per acre when the count was 52 borer egg masses per hundred plants. A second application followed, June 21, when the eggs were hatching. In spite of heavy rains that followed, the borer infestation was reduced to 14 per cent by two applications.

A second trial at the Kautz Brothers farm in Scott County showed corresponding results. The corn, in a field that had not been harvested for two years because of borer damage, was sprayed with a 50 per cent wettable DDT powder. Two pounds, mixed with 100 gallons of water, were applied per acre. When the first spray was applied June 16, the fields showed 72 egg masses per hundred plants. Following two additional applications, the infestation ranged from 6 to 10 per cent.

Significance of Results Discussed By Iowa Entomologist

"The significance of these results," Dr. Gunderson says, "extends beyond commercial sweet-corn production. With dusting by air already begun in Iowa, the time may not be far off when a single application of DDT by plane will be sufficient to reduce the borer population to below damaging proportions under favorable seasonal conditions. And the cost to the farmer for such operations should be somewhere in the neighborhood of $4 per acre.

"Even if more than one application is necessary, on the basis of prospective damage and prevailing corn prices, the farmer will stand to net from $20 to $30 per acre from such dusting investment. Moreover, the farmer will no longer have to delay planting to avoid the early borers."

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SEASONAL ABSORPTION OF NUTRIENTS BY FLORIDA ORANGE TREES

The U. S. Department of Agriculture research scientists whose work is reported below recognize the artificial nature of the root environment of orange trees in the sand cultures used in their studies. In fact, they warn that "judgment and caution must be exercised in any attempts to interpret their findings in terms of grove fertilizer procedures."

Nevertheless, they point out that the growing of plants in pure sand to which nutrient solutions are added "has long been a useful method in studying various phases of plant nutrition in which the information sought cannot be obtained from plants growing in soil under field conditions."

Raises Question Regarding Need for Change in Fertilizer Program

In their own experiments, they feel that the behavior of the trees with respect to seasonal intake of nutrients raises the question as to whether most fertilization programs for Florida orange trees "could not be made more efficient by varying the formula to comply more nearly with the seasonal ability of the trees to absorb the various ions, and also thereby to avoid excessive loss of leaching of soluble nutrients during periods of low intake."

The rate of absorption of various plant-food elements -- nitrogen, phosphorus, potassium, magnesium, and calcium -- by Florida orange trees, grown in sand cultures to which the nutrient solutions were added, fluctuated greatly with the season of the year.

Rate of absorption was low in the colder months, but increased rapidly following resumption of new growth and bloom in the spring.

While seasonal trends were similar, the absorption of the various nutrients differed greatly in the extent of their fluctuations and in the time of cessation and resumption of their main absorption periods.

The rate of absorption of nitrogen showed the least fluctuations of any of the nutrients studied.

These findings, reported by W. R. Roy and F. E. Gardner of the U. S. Department of Agriculture at the 1945 meeting of the Florida State Horticultural Society and published in the May, 1946, issue of "Citrus Magazine," were based on carefully controlled studies with trees grown in sand cultures to which the nutrient solutions were added.

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Half of the trees, which were planted in quartz sand in eight-gallon crocks (one control crock contained sand but no tree), received measured amounts of nutrient solution daily. Water was also added when necessary to keep the trees from wilting. At the end of each two-week period, the crocks were flushed out thoroughly with 30 liters of water over an eight-hour period. This wash water was mixed with leachate that had drained from the culture during the two-week period, and sampled for analysis. The difference between the amounts of nitrogen, phosphorus, potassium, magnesium, and calcium found in the leachate from the control crock and the amounts in each tree leachate represented that absorbed by the tree during that feeding period.

The second set of trees and a control crock were given water only, except at intervals of approximately three months when they were fed the nutrient solution for a two-week period, the leachate being collected and analyzed. These trees were fed intermittently to determine if "hungry" trees would have an appreciably different demand for the various elements than trees fed continuously.

The continuously fed trees gradually outgrew those fed intermittently. In the second season, the continuously fed trees produced an average of 10.3 pounds of fruit per tree, while the intermittently fed trees grew an average of only 6 pounds. There was no difference in quality or size of the fruit.

Nitrogen Absorbed At All Seasons -- Rate Lowest In January, February

Nitrogen was absorbed in appreciable amounts at all seasons of the year, with the rate of intake lowest in January and February. A rapid increase, beginning in March, reached a peak in April and May. The amount of nitrogen absorbed during feeding periods of both continuously and intermittently fed trees was the same, suggesting that the rate of nitrogen intake at any given period was not materially influenced by previous nitrogen consumption.

Absorption of Other Elements Very Low in January, February

Absorption of phosphorus, potassium, magnesium, and calcium was low in January and February. In fact, at this time there may have been some release of potassium and magnesium from the tree to the nutrient culture. After this period of low or no absorption, the rate of uptake increased rapidly following bloom.

From August 24 to September 7 of the second season, when nitrogen was purposely omitted from the nutrient solution, the rate of phosphorus, magnesium, and potassium intake was reduced to about half that of the preceding period. When nitrogen was restored, the intake of these elements increased sharply.

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Agricultural News Letter (Du Pont)
Vol. 15, No. 1 January-February, 1947

PHENOTHIAZINE-LEAD ARSENATE MIXTURE CONTROLS CODLING MOTH

Phenothiazine, the sensational chemical compound that controls more kinds of internal parasites in more kinds of animals than any other drug known, has found a new field of economic usefulness -- as an insecticide for the control of the codling moth.

Combined with lead arsenate, Du Pont's special agricultural grade of phenothiazine, which differs somewhat in composition and physical makeup from the regular phenothiazine, has given outstanding control of this devastating pest in numerous experiments and demonstrations, particularly in Pennsylvania, Virginia, West Virginia, Maryland, Delaware, and New Jersey. Tests are also being run in New York and other apple-growing states, where interest in the new combination spray is high.

Results of Tests In South-Central Pennsylvania

Dr. H. M. Steiner, until recently entomologist of the Pennsylvania Experiment Station, reports that 50 growers in the south-central part of the state last year used 70,000 pounds of agricultural grade phenothiazine with lead arsenate, largely in the middle three of the first five sprays applied after petal-fall. As is usually the case in such widespread tests, results varied, but in some cases stings and worms were reduced to 1 per cent.

"Many orchard insects are kept in control by other insects that prey on them or are parasites on them," Dr. Steiner says. "The phenothiazine-lead arsenate sprays harmed these useful insects much less than DDT, nicotine sulfate, and several other materials.

"Superior foliage and fruit developed where three phenothiazine-lead arsenate cover sprays were used following petal-fall and first cover sprays. The foliage superiority was so marked that it was noticeable to inexperienced observers."

The Pennsylvania entomologist says the new spray is recommended where codling moth infestation is excessively heavy, and that lighter carryover of moth makes lighter spray schedules possible for a year or two after phenothiazine is used.

Recommendations of Du Pont Company Entomologists

Du Pont's Grasselli Chemicals Department entomologists recommend using a specially prepared Du Pont mixture of 2 pounds of agricultural grade phenothiazine combined with 3 pounds of standard lead arsenate put up in convenient 5 lb. bags for use in water to make 100 gallons of spray,

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which mixture has given excellent control of codling moth during periods when the insect is unusually active and destructive.

"Lead arsenate without the phenothiazine and preferably in combination with 'Fermate' fungicide is recommended in the petal-fall and first cover sprays, to be followed by the phenothiazine-lead arsenate combination in the second, third, and fourth cover sprays," according to the recommendations. "In some seasons an additional application may be needed for protection against late first-brood codling-moth attack. For second-brood codling-moth control, growers should follow the suggestions of their state or federal experiment station."

Users are cautioned that phenothiazine will cause skin irritation to some persons. Contact with the skin and inhalation of the dust should be avoided. Users should wash off with soap and water.

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WARNS CATTLEMEN TO REMOVE MANURE PILES FROM BARNYARDS

"Failure of cattle growers to remove manure piles may cause condemnation of the most efficient insecticide," Ray L. Cuff, manager, National Live Stock Loss Prevention Board, told the annual meeting of the Agricultural Insecticide and Fungicide Association at Spring Lake, N. J.

Discussing the use of DDT insecticides for control of flies and other insects that attack cattle, Mr. Cuff emphasized the fact that "any man who does a thorough job of spraying his cattle and barns expects his animals to be free from horn, stable, and house flies, as well as mosquitoes."

He added, however, that those who neglect to remove manure piles and other fly-breeding places near barns may be disappointed.

"Such an individual is too likely to blame the insecticide used instead of putting the blame where it belongs -- on his own faulty barnyard management," he said.

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